Five-Year Review Report

First Five-Year Review Report
for
Missouri Electric Works Site
Cape Girardeau
Cape Girardeau County, Missouri

September 2004

PREPARED BY:

United States Environmental Protection Agency
Region 7
Kansas City, Kansas

Approved by:

Date:

Cecilia Tapia
Director
Superfund Division
U.S. EPA, Region 7

Table of Contents

Tables

Attachments

List of Acronyms

Acronym	Definition
1,1,1-TCA	1,1,1-Trichloroethane
1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethene
1,2-DCE	1,2-Dichloroethene
1,2,4-TCB	1,2,4-Trichlorobenzene
1,2-DCB	1,2-Dichlorobenzene
1,3-DCB	1,3-Dichlorobenzene
1,4-DCB	1,4-Dichlorobenzene
ARAR	Applicable or Relevant and Appropriate Requirement
ATSDR	Agency for Toxic Substances and Disease Registry
BGS	Below Ground Surface
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CIC	Community Involvement Coordinator
EPA	United States Environmental Protection Agency
CFR	Code of Federal Regulations
DOJ	Department of Justice
ESD	Explanation of Significant Differences
FS	Feasibility Study
LTTD	Low Temperature Thermal Desorber
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDNR	Missouri Department of Natural Resources
MEW	Missouri Electric Works

Acronym	Definition
MEWSC	Missouri Electric Works Steering Committee
MEWSTD	Missouri Electric Works Site Trust Donor
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCB	Polychlorinated Biphenyl
PCE	Perchlorethene
PIC	Product of Incomplete Combustion
PPB	Parts per Billion
PPM	Parts per Million
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
TCE	Trichlorethene
TSCA	Toxic Substances Control Act
USGS	United States Geological Survey
VOC	Volatile Organic Compound

Executive Summary

The soil remedy for the Missouri Electric Works Superfund site in Cape Girardeau, Missouri, included excavation, processing, and treating polychlorinated biphenyls- (PCB-) contaminated soils using thermal desorption technology. After treatment and analyses to confirm that treatment standards had been met, treated soil was used to backfill excavated areas onsite. The entire area was capped with a contaminant-free soil. The upper foot of cap was enriched to support vegetation. The soil remedy was complete with the acceptance of the Soil Remedial Action Report during September 2000. The trigger for this five-year review is the start of remedial action (RA) on-site construction, which occurred June 7, 1999.

The ground water portion of the remedy at the Missouri Electric Works Superfund site has not been implemented. After the Record of Decision (ROD) was signed in 1990, new hydrogeologic information was obtained by the Missouri Electric Works Steering Committee (MEWSC). This new information indicated that there was a possibility that PCBs were present in the ground water at depths greater than 300 (300+) feet. Solution features were encountered at depths of 110, 220, and 315 feet below ground surface (bgs). The solution cavities at depths of 220 and 315 feet bgs were mud-filled; the mud and water were contaminated with PCBs. A focused remedial investigation and feasibility study (RI/FS) for ground water has been conducted for the site. The Environmental Protection Agency (EPA) expects to issue an amendment to the 1990 ROD to address the "new" ground water conditions.

The assessment of this five-year review found that the soil remedy was conducted in accordance with the requirements of the ROD. One Explanation of Significant Differences (ESD) was issued to include on-site thermal desorption in addition to on-site incineration as acceptable methods of treating the PCB-contaminated soils. The soil remedy is functioning as designed.

The threats from ground water have not been addressed. (There is no human consumption of ground water in the immediate area.) All components of the 1990 ROD have not been implemented; therefore, protectiveness has been achieved only for the soils. Additionally, new policy to assess the potential threat to ecological systems or the environment have been implemented since 1990. There is a need to perform an investigation to collect data necessary for an Ecological Risk Assessment to determine whether additional efforts are necessary to achieve protectiveness of the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site Name(from WasteLAN): **Missouri Electric Works**

EPA ID (from WasteLAN): **MOD980965982**

Region: **7**	State: **MO**	City/County: **Cape Girardeau/Cape Girardeau**

SITE STATUS

NPL status: [X] Final [ ] Deleted [ ] Other (specify)

Remediation status (choose all that apply): [X] Under Construction [ ] Operating [X] Complete

Multiple OUs? * [X] YES [ ] NO	Construction Complete Date: ___/___/_____

Has site been put into reuse? [ ] YES [X] NO

REVIEW STATUS

Lead agency: [X] EPA [ ] State [ ] Tribe [ ] Other Federal Agency _____

Author name: Pauletta R. France-Isetts

Author title: Remedial Project Manager	Author affiliation: U.S. EPA, Region 7

Review period: ** **12/11/2003** to **08/31/2004**

Date(s) of site inspection: **12/11/2003** & **04/19/2004**

Types of review:
[X] Post-SARA [ ] Pre-SARA [ ] NPL-Removal Only
[ ] Non-NPL Remedial Action Site [ ] NPL State/Tribe-lead
[ ] Regional Discretion

Review number: [X] 1 (first) [ ] 2(second) [ ] 3 (third) [ ] Other(specify)

Triggering Action:
[X] Action RA On-site Construction at OU #1 [ ] Actual RA Start at OU # ___
[ ] Construction Completion [ ] Previous Five-year Review Report
[ ] Other (specify)

Triggering action date (from WasteLAN): **June 7, 1999**

Due date (five years after triggering action date): **June 7, 2004**

* [OU refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

Erosion along the eastern perimeter of the site has caused some of the treated soils and cap soils to leave the site. The treated soils are highly susceptible to erosion; therefore, it is necessary to maintain the soil cap and vegetative cover.

Institutional controls were not placed on the site with regards to soil contamination since all soils with PCB concentrations greater than 10 parts per million (ppm) were removed from the site.

Institutional controls have not been placed on the site with regards to ground water; this needs to be done.

A wetland area south of the MEW property has been impacted by contamination from the site.

Insufficient ground water monitoring data have been collected in the wetland area to determine whether or not the contaminant plume is migrating.

Insufficient ground water parameter data have been collected to evaluate whether or not natural attenuation is occurring.

Recommendations and Follow-up Actions:

The erosional area of concern should be inspected annually. If the slope conditions have deteriorated, the property owner should repair the slope.

The 1990 ROD should be amended to remove the requirement of institutional controls for the site soils.

It may be necessary to implement institutional controls for ground water.

An Ecological Risk Assessment and investigation needed to collect the required data should be performed. A decision should be made at that time with regards to any additional actions that may be required for protectiveness of the environment.

Additional ground water data will be collected to evaluate whether or not the contaminant plume in the wetland area is migrating.

Additional ground water data will be collected to evaluate whether or not natural attenuation is occurring below the wetland.

Protectiveness Statement(s):

The soil remedy is protective of human health. The ground water portion of the remedy has not been implemented. The ground water could present a risk to human health through ingestion or inhalation. New standards have been instituted for ecological protectiveness since the ROD was written. Additional work needs to be performed to determine whether or not there is an ecological risk.

Additional sampling and monitoring of the ground water will be performed to evaluate the migration of the contaminant plume below the wetland area and to evaluate the potential of natural attenuation of the contaminants of concern. An investigation will be performed to gather the data necessary for the Ecological Risk Assessment. A determination will be made after the Ecological Risk Assessment is complete, whether or not additional actions will be required for protectiveness of the environment.

Long-term Protectiveness:

The completion of the soil remedial action (destruction of the PCBs in site soil) has resulted in the long-term protectiveness of human health with regard to exposure pathways posed by contaminated soil at the site.

As stated above, due to the post-ROD discovery of contamination at depth in the ground water, the ground water remedy selected in the ROD has not been implemented. The responsible parties conducted a Ground Water Design Investigation to ascertain the extent of the contamination and to present ground water remedial options. That Ground Water Design Investigation was recently completed by the MEWSC and submitted to EPA for review. The EPA anticipates that it will soon select a ground water remedy for implementation at the site. The long-term protectiveness of that remedy will presumably be considered in EPA's next five-year review for the site.

The long-term protectiveness of the soil remedy as to the environment will be evaluated following the completion of the Ecological Risk Assessment and any actions required thereby have been taken. The long-term protectiveness of the soil and ground water remedies as to the environment will be considered in EPA's next five-year review for the site.

Other Comments:

The EPA expects that there will be an amendment to the 1990 ROD during December 2004. This amendment will address the ground water in the karst bedrock aquifer. Additional studies of the ground water in the alluvial aquifer below the wetland will be performed. Another ROD amendment may be required after sufficient data have been gathered and analyzed.

Missouri Electric Works Superfund Site
Cape Girardeau, Missouri
First Five-Year Review Report

I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues, if any, found during the review, and identify recommendations to address such issues.

The EPA is preparing this five-year review report pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Section 121(c) provides:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with [Sections 104 or 106 of CERCLA], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The EPA has interpreted this requirement further in the NCP; 40 C.F.R. § 300.430(f)(4)(ii) provides:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected remedial action.*

The EPA, Region 7, conducted the five-year review of the remedy implemented at the Missouri Electric Works (MEW) Superfund site, in Cape Girardeau, Missouri. This review was conducted by the Remedial Project Manager (RPM) for the entire site from December 2003 through July 2004. This report documents the results of the review.

This is the first five-year review for the Missouri Electric Works site. The triggering action for this statutory review is the start of remedial action (RA) on-site construction, which occurred on June 7, 1999. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1 – Chronology of Site Events

Event	Date
Site discovery	10/25/1984
EPA-lead Expanded Site Investigation conducted	05/01/1987
PRP search initiated	01/15/1988
PRP lead RI/FS initiated	12/31/1988
Site listed on the NPL	02/21/1990
Remedial Investigation (RI) report submitted to EPA	06/04/1990
Record of Decision (ROD) signed	09/28/1990
Special Notice letters sent	12/21/1990
Good Faith Offer received	03/04/1991
PRPs perform post-ROD ground water investigation with EPA oversight	07/06/1991
RD/RA Consent Decree negotiations conclude	09/19/1991
Consent Decree transmitted to all parties for signature	09/26/1991
Signed Consent Decree sent to DOJ for lodging in federal court	12/30/1991
PRPs submit ground water investigation report	01/09/1992
Additional PRPs identified	01/16/1992
EPA “approves” ground water report after review	03/19/1992
Unidentified person(s) dumps tons of lime on site (additional material will require treatment)	05/1992
OSC samples materials dumped on site by persons unknown Civil investigator attempts to identify person(s) responsible	05/1992
Late parties signed consent decree	06/15/1992
DOJ files complaint, lodges Consent Decree	06/291992
District Court enters Consent Decree	08/29/1994
De minimis parties make payments to MEW trust and Superfund	09/1994

Event	Date
Settling Defendants retain Construction Management Contractor	09/1994
Appeal filed by Intervenors	10/28/1994
Settling Defendants submit information on thermal desorbers and request EPA to review and change ROD	10/1994
McLaren-Hart petitions EPA HQ for National TSCA permit demonstration at MEW site	10/1994
Availability session in Cape Girardeau to let public know that considering inclusion of thermal desorbers	12/14/1994
Explanation of Significant Differences to ROD issued by EPA	02/01/1995
Pilot study using innovative low temperature/high vacuum thermal desorber unit	05/15/1995
8th Circuit Court of Appeals remands Consent Decree to District Court	08/1995
McLaren-Hart submits report on demonstration test at the MEW site	06/1996
DOJ lodges Consent Decree (second time)	06/29/1996
District court re-enters Consent Decree	08/14/1996
Intervenors appeal re-entry of Consent Decree	10/07/1996
8th Circuit Court of Appeals re-affirms District Court's entry of Consent Decree	12/1997
Request for Proposal for soils contractor issued	05/1998
Williams Environmental Services selected as soils contractor	08/25/1998
Preliminary remedial design (RD) submitted	10/01/1998
Pre-final RD and draft Remedial Action Work Plan (RAWP) submitted	12/22/1998
100% RD and revised RAWP submitted	05/19/1999
RA on-site construction start	06/07/1999
Ground water RI/FS start (OU 2)	06/12/2000
Final Inspection	09/19/2000
Remedial Action Report final approval	09/29/2000
Ground water RI submitted (OU 2)	08/02/2004

Event	Date
Ground water FS submitted (OU 2)	07/30/2004
Amended Record of Decision (anticipated)	*12/31/2004*

III. Background

Physical Characteristics

Cape Girardeau, Missouri, is a thriving community of about 37,000 permanent residents. Cape Girardeau is located in southeastern Missouri along the Mississippi River. It is a regional hub for education, commerce, and medical care. Southeast Missouri State University is located in Cape Girardeau. It is estimated that approximately 50,000 additional people visit Cape Girardeau daily to work, go to school, get medical care, or shop.

MEW operated on a 6.4-acre tract adjacent to U.S. Highway 61 (South Kingshighway) in Cape Girardeau. Attachment 1 indicates the location of the site within the city limits of Cape Girardeau, Missouri. The site includes all areas which became contaminated with PCBs originating from MEW's operations. Attachment 2 indicates the area that has been impacted by the contamination from the site. The site is located in a predominately commercial/industrial area of Cape Girardeau. The area surrounding the site has experienced significant development since the early 1990s when the site was listed on the National Priorities List (NPL).

The site is situated approximately 1.6 miles west of the Mississippi River. It is located in the hills adjacent to the west valley wall of the Mississippi River flood plain. Intermittent run-off channels emanate from the north, south, and east boundaries of the site and eventually drain into the Cape LaCroix Creek which is located 0.7 miles east of the site. The Cape LaCroix Creek flows 1.1 miles to the southeast and enters the Mississippi River. The property is bounded on the north by retail and warehouse properties, on the south by a residence, commercial storage, and a construction company, and on the east by a warehouse. A wetland is located approximately 700 feet south of the MEW property. Attachment 3 indicates the approximate location of the wetland in relation to the MEW property and the city of Cape Girardeau.

Land and Resource Use

MEW purchased the property in 1952. Prior to that, it is believed that the land was used for agricultural purposes. MEW operated an electrical repair, service, and resell business from the location from 1954 to 1992. The facility has not operated since 1992.

The current land use for the surrounding area is predominantly commercial. There are recreational soccer fields located east of the site. Significant new business construction has occurred near the site. It is expected that the land use in the area will not change significantly. In establishing cleanup requirements for the site, EPA considered the theoretical possibility of an

on-site residence. The thermally treated soils were used to backfill the excavations at the site. After soils treatment was complete, a vegetative cover was established to protect the site from erosion.

History of Contamination

MEW serviced, repaired, reconditioned, and salvaged electrical equipment from 1954 to 1992. Electrical equipment handled during this time consisted of oil-filled electrical transformers, electric motors, electrical equipment controls, and oil-filled switches. PCBs, first manufactured in the 1920s, have excellent fire-retardant properties. PCBs were often added to the dielectric fluid in electrical equipment to minimize the potential for fires. The Toxic Substance Control Act (TSCA) of 1978 banned the future manufacture of PCBs and required that electrical equipment containing more than 500 ppm PCB had to be removed from service. This regulation resulted from studies which indicated that PCBs are a probable human carcinogen; they are extremely stable in the environment (they do not degrade), and they bio-accumulate in the food chain. The products of incomplete combustion of PCBs are dioxins and furans.

During its operational history, MEW reportedly recycled materials from old units, selling copper wire and reusing the dielectric fluids from the transformers. The salvaged transformer oil was filtered through Fuller's earth for reuse. An estimated 90 percent of the transformer oil was recycled. According to business records obtained from MEW, more than 16,000 transformers were repaired or scrapped at the site during its time of operation. The total amount of transformer oil that was not recycled was estimated to be 28,000 gallons. Information gathered during interviews of former employees indicates that the majority of the non-recycled oil was disposed of on the site. In 1984, approximately 5,000 gallons of waste oil was removed by a contractor after the TSCA inspection by the Missouri Department of Natural Resources (MDNR).

Industrial solvents were used to clean the electrical equipment being repaired or serviced. Solvents were reused until they were no longer effective. Spills and disposal of spent solvents on the MEW property were described by past employees during EPA-conducted interviews. The MEW and adjacent properties have been found to be contaminated with PCBs.

Initial Response

The site was discovered in 1984 during a TSCA inspection. PCB-contaminated soils and inappropriate storage of over 100 55-gallon drums of PCB-contaminated oils were identified. The EPA performed additional investigations to characterize the amount of contamination between 1985 and 1988. The EPA issued an administrative order requiring that the owner/operator of the site no longer handle any oil-filled electrical equipment with PCB concentrations greater than 2 ppm, that erosion barriers be placed in all drainage features to minimize the amount of PCB contamination migrating offsite via storm water runoff, and that vegetables grown on site not be sold or given away to anyone outside of the site owner’s

immediate family.

The site was proposed for inclusion on the NPL on June 24, 1988, and finalized on the NPL on February 21, 1990. Former MEW customers were informed of their potential liability beginning in June of 1988. A steering committee of former customers known as the Missouri Electric Works Steering Committee (MEWSC) was formed. The MEWSC performed a RI/FS during 1989 and 1990. The RI/FS was made available to the public during June 1990. The Proposed Plan identifying EPA's preferred remedy was presented to the public during August 1990, starting the period for public comment.

Basis for Taking Action

Contaminants

Hazardous substances that have been released to the site in each media include:

Soil	**Ground water**
PCBs	1,1-dichloroethane
methylene chloride	trans-1,2-dichloroethene
trichloroethene	chlorobenzene
trichloroethane	trichloroethene
chlorobenzene	tetrachloroethene
	benzene
Sediment	**Air**
PCBs	PCBs

The risks to human health and the environment represented by the PCB contamination were evaluated assuming that the site could be used for recreational, residential, or occupational use. Exposure routes included inhalation of PCB-contamination dust or PCB vapors, ingestion of PCB-contaminated soil, or dermal contact with PCB contamination. The health risks represented by the PCB contamination at the site are unacceptable. The carcinogenic risk represented by the PCB-soil contamination at the site for the current use scenario was estimated to be $1x10^{-3}$, or one additional cancer for every 1,000 persons. The carcinogenic risk represented by PCB contamination at the site for future residential use of the site was $1x10^{-2}$, or one additional cancer for every 100 persons.

A Human Health Risk Assessment (HHRA) of the site was performed by the MEWSC during 1990. The purpose of the HHRA was to assess the risks posed to human health by the contaminants at the site. Contaminants at the site included: PCB-contaminated soils and sediments, volatile organic compound (VOC)- contaminated soils and sediments, and VOC contamination of the ground water.

The HHRA evaluated both current and future exposure situations. For purposes of the HHRA, it was assumed that no remedial action would be performed at the site in order to evaluate the possible future risks posed by the contamination. The following routes of exposure were evaluated: ingestion of PCB-contaminated and VOC-contaminated soil/sediment by children and adults; inhalation of PCB-contaminated and VOC-contaminated dust particles/vapors by children and adults; dermal (skin) exposure to PCB-contaminated and VOC-contaminated soil/sediment; and ingestion of VOC-contaminated ground water by children and adults (future use only). It was assumed that these exposures would occur during the following activities: recreational; residential, and occupational (adults only).

The HHRA indicated that contamination at the site presented an unacceptable risk to human health and the environment. The principal threat from the site was due to human exposure to the PCB-contaminated soils. The analyses were based on "most probable case" and "worst case" exposure scenarios. Potential risks associated with exposure to ground water are attributed to the presence of chlorinated compounds that exist at concentrations that exceed state maximum contaminant levels (MCLs).

IV. Remedial Actions

Remedy Selection

The ROD for the site was issued by EPA on September 28, 1990. Remedial Action Objectives (RAOs) were developed as a result of data collected during the RI to aid in the development and screening of remedial technology alternatives to be considered in the ROD. The EPA's national goal for the Superfund program is to select remedies that will be protective of human health and the environment, that will maintain protection over time and that will minimize untreated waste. In establishing remedial goals for the site, EPA considered applicable or relevant and appropriate requirements (ARARs) specific to the contaminants of concern; the HHRA; MCLs and Maximum Contaminant Level Goals (MCLGs) established under the Safe Drinking Water Act; and EPA guidance and policy, specifically the TSCA PCB Spill Cleanup Policy, 40 C.F.R. Part 761.

Source Control Response Objectives

- Minimize the migration of contaminants from site soils
- Reduce risks to human health by preventing direct contact with and ingestion of contaminants in site soils
- Minimize the migration of contaminants from the site to the adjacent wetland

Management of Response Objectives

- Eliminate or minimize the threat posed to human health and the environment by

preventing exposure to soil, air, and sediment contaminants

- Prevent further migration of soil contamination beyond the then current site boundaries

- Restore contaminated ground water to state ARARs, which are considered to be protective of human health and the environment, within a reasonable period of time

The major components of the source control remedy selected in the ROD include the following:

1. Preparation of the site will be performed by clearing trees and vegetation in the area where the incinerator is to be placed.
2. Excavation and on-site incineration of all soils with PCB concentrations in excess of 10 ppm to a depth of 4 feet, and 100 ppm at depths greater than 4 feet. Excavated soils will be consolidated onsite with provisions to minimize migration of the contaminated materials.
3. Mobilization and set-up of the incinerator at the site.
4. Conduct trial burn(s) to ensure the operational capabilities of the incinerator.
5. Monitor continuously incinerator feed rates. Frequent monitoring of incinerator emissions from the incinerator, both ash and gases, to document that destruction efficiencies and air emissions standards are complied with. Testing of the ash residuals from the treatment process will be performed to identify leaching characteristics, to identify the compounds within the ash and to verify that the ash contains less than 2 ppm PCB.
6. Backfill excavated areas using treated soils, after analytical tests confirm that treatment standards are met.
7. De-mobilizaton of the incinerator from the site when treatment of PCB-contaminated soils is complete.
8. Restoration and revegetation of the site.
9. Impose institutional controls, such as deed restrictions and/or zoning restrictions to limit use of the site to industrial or commercial purposes.

The major components of the migration management remedy selected in the ROD include:

1. Perform additional investigation of the hydro-geologic regime in the vicinity of the site to identify the vertical extent of contamination; confirm the presence or absence of a continuous aquiclude within the upper 200-300 feet of the bedrock.
2. Perform pump tests to determine the flow rates and hydraulic conductivity of the aquifer to gather additional data necessary for the design.
3. Design the extraction well network, including well locations, pump sizes, pumping frequency, location and sizes of connecting piping.
4. Sample water extracted during the pump tests for identification of the contaminants and associated concentrations present in the ground water.
5. Extract and treat ground water utilizing an extraction well network, temporary storage, followed by removal of volatile organic compounds using an air-stripper with gas phase

carbon adsorption from the air stream.

6. Perform five-year reviews to assess site condition, contaminant distributions, and any associated site hazards.

An Explanation of Significant Differences (ESD) to the ROD was issued on February 1, 1995. Technologies (thermal desorption) capable of effectively dealing with the contamination at the site had been developed and demonstrated successfully. The MEWSC provided information supporting the ESD as a focused feasibility study in October 1994. The EPA reviewed the information and concurred that thermal desorption would be a viable alternative. The EPA notified the public of the proposed change, conducted a meeting in Cape Girardeau, Missouri, during December 1994 and issued the ESD. The primary changes documented in the ESD were:

- Changing on-site incineration to on-site thermal treatment
- Defining on-site thermal treatment to be either incineration or thermal desorption

Remedy Implementation

The Consent Decree (CD) signed by the EPA, the Missouri Department of Natural Resources (MDNR), 175 Settling Defendants and 3 federal agencies was referred to the Department of Justice (DOJ) on December 30, 1991. One-hundred thirty-four (134) of the Settling Defendants were *de minimis* parties that elected to "cash-out" their liability with regards to either soil or soil and ground water response actions. The CD was lodged in the Federal District Court for the Eastern District of Missouri, Southeastern Division, in June 1992. It was approved or entered by the Court during August 1994. The CD entry was appealed by a group of non-settling former MEW customers during October 1994. The 8th Circuit Court of Appeals reversed the entry of the CD and remanded the CD to the Federal District Court during August 1995 for further deliberation; the CD was approved a second time by the Federal District Court on August 14, 1996. The same group of former customers again appealed the CD entry. The 8th Circuit Court of Appeals confirmed entry of the CD during December 1997.

The Remedial Design (RD) was conducted in conformance with the soils response actions identified in the ROD as modified by the ESD. The RD was conditionally approved by EPA on March 25, 1999.

The MEWSC requested that EPA allow it to further investigate ground water contamination during late 1990. The purpose of the investigation was to "prove" the presence of a confining layer (shale) that would inhibit the downward migration of contaminants in the ground water. The EPA agreed to the investigation. Drilling for the new well began in January 1991. A pilot hole was drilled to about 220 feet to verify the condition of the limestone bedrock. This hole was continuously cored within the bedrock; the quality of the rock was good. The location of the new monitoring well (MW-11) was approximately 10 feet southwest of the pilot boring. While drilling, a solution feature was detected at a depth of about 110 feet bgs. Casing was "seated" in the rock below the void; the boring grouted and re-drilled using a smaller

diameter drill bit. A second, larger solution feature about 10 feet high was detected at a depth of about 220 ft. bgs. This void was mud-filled; the mud was sampled, PCB contamination of the mud and water was detected. Again the casing was "seated" in the rock below the void; the boring grouted and re-drilled using a smaller diameter drill bit (this is referred to as telescoping the hole). A third large solution feature was encountered at a depth of about 315 feet bgs. This void was also mud-filled. Several thousand gallons of the mud-slurry material within the hole was pumped and then sampled. PCB contamination of the sediment-water mixture and water (the solids were removed using a centrifuge) was detected. The hole was telescoped again. The hole was advanced to a depth of 405 feet bgs. Ground water was collected and sampled. PCBs were detected at 2 parts per billion (ppb). (The MCL for PCBs in ground water is 0.5 ppb.)

The new ground water information resulted in the identification of a significant data-gap. As a result, the CD provided for the cleanup of the PCB-contaminated soils, in accordance with the ROD, and for a focused investigation and feasibility study of the ground water ("additional investigation of the hydro-geologic regime in the vicinity of the MEW site will be performed") and treatment of the contaminated ground water within about 70 feet of the ground surface using pump and treat technology. Ground water response actions identified in the ROD were not included in the CD due to the lack of information needed for design and cost analysis purposes.

The work identified in the CD took place in two phases; the first was thermal treatment of the PCB-contaminated soils, and the second was the focused ground water study. After several years delay due to legal proceedings, the contract for thermal treatment of the soils was awarded on August 25, 1998. The remedial design was conditionally approved on March 25, 1999. On-site mobilization, clearing and grubbing efforts began on June 7, 1999. Thermal treatment of the PCB-contaminated soils was completed on July 25, 2000. The work for the soils operable unit (OU) was finished with the approval of the Remedial Action Report on September 29, 2000. The major components of the Soils Remedial Action were:

- Clearing and grubbing of the site
- Construction of concrete pad for the Low Temperature Thermal Desorption (LTTD) unit
- Mobilization and set-up of the LTTD unit
- Excavation of PCB-contaminated soils
- Screening/processing of PCB-contaminated soils in preparation for thermal desorption
- LTTD trial runs (process had to meet specified destruction criteria and not create products of incomplete combustion [PICs])
- Review of LTTD trial run(s) data
- Approval to treat soils using parameters established during trial runs
- Excavation of deep PCB-contamination (up to 25 feet bgs) - all soils with PCB concentrations greater than 100 ppm removed from the site (sinkholes were detected on

site, with one being at the location of monitoring wells MW-3, MW-5, and MW-11)

- Modification of excavation plan to leave habitat for pair of nesting red-tailed hawks
- Production treatment of PCB-contaminated soils
- Backfill and regrading of site
- Re-vegetation of site
- Pre-final/Final Inspection

The pre-final inspection concluded that the soils remedial action had been conducted and completed in accordance with the soils remedial design plans and specifications; a punch list of additional work items was not needed.

The second phase of the work performed pursuant to the CD consisted of the ground water investigation and feasibility study. Since the decision was made during the soils remedial action that all PCBs in excess of 100 ppm would be removed, the soils remedial action acted as a source removal for the ground water contamination. Upon completion of the thermal desorption activities, the existing ground water monitoring wells were sampled on a quarterly basis for about two years. During this time, non-invasive investigations were performed to better define the joint patterns within the bedrock. The purpose of the non-invasive work was an attempt to get data to formulate a model of the underlying bedrock. This was made extremely difficult by the fact that the bedrock below the site is karst; solution features have been carved in the bedrock by the ground water. It is very difficult, if not impossible, to track contaminants within karst bedrock. A model of the bedrock was created. Additional monitoring wells were installed at those locations most likely to be contaminated. These wells, along with the original wells, were monitored for four quarters. Ground water data were analyzed, and the decision was made that additional monitoring wells were needed near the northern edge of the wetland area. Three nests of wells were installed. All monitoring wells were sampled quarterly for another year. Chlorinated compounds were detected in the samples from the wetland wells. Two more sets of nested wells were installed further south and west in the wetland area. A third set of nested wells were planned to monitor ground water east of the wetland area. These wells were not installed due to lack of alluvium in this area. A focused RI/FS was then submitted to EPA.

The EPA and the state of Missouri have determined that all work identified in the CD, with the exception of implementation of institutional controls, were performed according to specifications and approved work plans. The EPA anticipates that a ROD amendment will be

issued in the near future that will address the ground water and deleting the requirement for institutional controls for the soil. (PCB contamination left onsite and at depth does not represent an unacceptable risk; therefore institutional controls are not needed.)

System Operation/Operation and Maintenance

Representatives of the MEWSTD conducted the monitoring and maintenance activities with regard to the vegetative cover over the treated soils. About a year after constructing the cap, a site visit was made to observe the condition of the cap, identify any erosional features, and assess the success of vegetating the cap. Several erosion rills were identified and filled, new grass seed was planted, and erosion barriers (rock-filled gabbions) were erected along the eastern-most edge of the site.

No long-term operation and maintenance activities were required in the CD. There are no operation and maintenance activities being performed.

V. Progress Since the Last Five-Year Review

This was the first five-year review for the MEW Superfund site.

VI. Five-Year Review Process

Administrative Components

Members of the MEWSTD and the community were notified of the five-year review on March 1, 2004. The MEW five-year review was performed by Pauletta France-Isetts, EPA Remedial Project Manager (RPM). Don Van Dyke, MDNR, assisted in the review as the representative for the support agency.

The review schedule components included the following:

- ☐ Community involvement
- ☐ Document review
- ☐ Data review
- ☐ Site inspection
- ☐ Local interviews
- ☐ Five-year review report development and review

These efforts were performed from December 11, 2003, through August 31, 2004.

Community Involvement

Activities to involve the community in the five-year review were initiated with a meeting in February 2004 between the RPM and the Community Involvement Coordinator for the site. A notice was sent to the local newspaper in Cape Girardeau that a five-year review was to be conducted. A fact sheet was sent to all entities identified on the site mailing list. A letter stating

the same was sent to the MEWSTD project coordinator, MEWSTD chair, MEWSTD legal representative, the city of Cape Girardeau, Cape Girardeau County Health Department, the state of Missouri Health Department, the Agency for Toxic Substances and Disease Registry (ATSDR), United States Geological Survey, and MDNR. The Fact Sheet and letters invited the recipients to submit any comments to EPA.

On March 20, 2004, a notice was sent to the same local newspaper to announce that the five-year review process for the site was underway. Following execution by EPA, the five-year review report will be available to the public at the Cape Girardeau Public Library and the EPA Region 7 office.

Document Review

This five-year review consisted of a review of relevant documents including the remedial action report and ground water monitoring data. Applicable clean-up standards (as listed in the 1990 ROD) were also reviewed. New policy and guidance documents for risks posed by PCBs, both human health and ecological, were also reviewed. The documents reviewed are listed in Attachment 4.

Data Review

Remedial Action Report

All soils contaminated with PCBs at concentrations in excess of 10 ppm were to be excavated and treated. Approximately 38,000 tons of PCB-contaminated soil were excavated and thermally treated during the soil remedial action. Confirmation composite samples were collected within 143 50' x 50' grids. The average PCB concentration for the confirmation samples was 1.6 ppm; the mean PCB concentration was 0.7 ppm.

Ground Water Investigation

Ground water monitoring, as part of the focused ground water investigation, has been conducted at the site since June 2000. No new ground water monitoring wells were installed at the site for approximately two years following the soil remedial action. The purpose of the monitoring was to gather data sufficient to evaluate the impact of the PCB source removal on ground water quality.

Ground water samples were analyzed for the following compounds: 1,1,1-Trichloroethane (1,1,1-TCA), Trichlorethene (TCE), Perchlorethene (PCE), 1,1-Dichloroethane (1,1-DCA), 1,1-Dichloroethene (1,1-DCE), 1,2-Dichloroethene (1,2-DCE), Benzene, Chlorobenzene, Toluene, Chloroform, 1,2,4-Trichlorobenzene (1,2,4-TCB), 1,2-Dichlorobenzene (1,2-DCB), 1,3-Dichlorobenzene (1,3-DCB), 1,4-Dichlorobenzene (1,4-DCB), Butyl benzyl phthalate, Di-n-butyl phthalate, Bis(2-ethylhexyl phthalate, PCB unfiltered, and PCBs filtered (see Tables A-1 to A-14 in Attachment 6). Where detected, the concentrations of

the these parameters have decreased or remained constant, indicating that the majority of the source material was successfully removed. The following contaminants were detected at or above the MCL as promulgated under the Federal Safe Drinking Water Act: TCE, PCE, Benzene, Chlorobenzene, and PCBs (unfiltered).

Ecological Risk Assessment Guidance

The EPA issued guidance entitled, "Ecological Risk Assessment and Risk Management Principles for Superfund Sites" (OSWER Directive 9285.7-28 P) on October 7, 1999. This guidance states that "[a]s the Superfund program has matured, it has given more and more consideration to the potential effects of hazardous substances releases on ecological receptors."

Information regarding the potential toxicity and bio-accumulation of PCBs in the food chain has increased significantly since the ROD was issued in September 1990. There is concern that the PCB concentrations that remain at the site, particularly in the wetland area, could represent an ecological threat. Insufficient data are available to perform an ecological risk assessment.

Site Inspection

Inspections at the site were conducted on December 11, 2003, by the RPM and during April 2004 by MDNR representatives. The purpose of the inspections was to assess the protectiveness of the soil remedial action and to assess the completeness of the ground water investigation. The area addressed by the soil remedial action was inspected to assess the integrity of the cap, the completeness of the vegetative cover, and the stability of the erosion features. The vegetative cover was well established. There is some erosion that is still occurring along the eastern edge of the site. The majority of the erosion has been halted by placing rock-filled gabbions in the erosion features. The cap appears to be intact. The pair of red-tailed hawks are still nesting in the trees along the eastern perimeter of the site.

The inspection related to ground water was conducted to ensure that the rate and extent of contamination, the ground water flow direction and the ground water heads were identified for the RI/FS.

No institutional controls were placed on the areas addressed by the soil remedial action. The soils were excavated to PCB concentrations less than 10 ppm. The ROD identified leaving PCBs at concentrations of up to 100 ppm at depths below four feet. Since no PCB concentrations at depth exceeded 100 ppm, the need for deed restrictions for soil contamination no longer existed.

Interviews

Interviews were conducted with some parties connected to the site. No significant problems regarding the site were identified during the interviews.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The review of documents indicates that the soil remedial action is functioning as intended by the ROD and ESD. However, due to the discovery of PCBs in the ground water, at depth, no remedial action has been taken to address the threat posed by ground water. Since no remedial action for ground water has been implemented, the remedy is not functioning as intended by the ROD and ESD.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

The exposure assumptions for human health remain valid. The toxicity data and cleanup levels for PCBs have not changed significantly. There are more data available on reproductive toxicity for PCBs now than there was in 1990. Studies and research are being performed to evaluate the protectiveness of the toxicity values now in use. The RAOs for the soil cleanup remain valid.

Changes in Standards To Be Considered

The estimate of ecological risk has been formalized since 1990 when the ROD was issued. PCBs bio-accumulate and bio-magnify in the food chain. Screening levels for PCBs are quite low. A formal ecological risk assessment should be performed at the site to evaluate the threat, if any, posed by the PCBs. Unacceptable ecological risks will need to be addressed and/or managed.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

PCBs, chlorobenzene, PCE, benzene, and TCE were detected in the ground water within the area identified as the site. All five contaminants were detected at concentrations above state and federal MCLs. The presence of these contaminants in the ground water needs to be addressed.

The exposure assumptions used to develop the soils portion of the HHRA included both current and future exposures (child recreational, child residential, adult recreational, adult residential and adult worker). There have been no changes in the toxicity factors for the contaminants of concern that were used in the HHRA. These assumptions are considered to be conservative and reasonable in evaluating the human health risk and developing human health risk-based cleanup levels. No changes to these assumptions or the cleanup levels developed from them are warranted to protect human health.

Baseline Risk Assessment now includes human health and ecological risk assessment.

Ecological risk was not estimated in 1990. Investigation of the wetland soils, sediments, surface water, and soils within about four feet of the ground surface need to be sampled and analyses performed to evaluate the risk, if any, to the environment posed by the site.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Several karst features were detected at, near, or below the site after the ROD was issued. Two sink-holes were found; one offsite and the other near the location of MW-3, MW-5, and MW-11A. During the installation of MW-11A, subsurface voids (solution features) were encountered at depths of 110 feet bgs, 220 feet bgs, and 315 feet bgs. This information may result in the ground water remedial action, selected in 1990, being impractical to implement.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the soil remedy is functioning as intended by the ROD, as modified by the ESD. The ground water remedy has not been implemented. There have been no changes in the physical conditions of the site that would affect the protectiveness of the soil remedy. The ARARs for soil contamination cited in the ROD have been met. There have been no changes in the toxicity factors for the contaminants of concern that were used in the HHRA; there has been no change in the standardized risk assessment methodology for human health. There has been a change in the standardized methodology for ecological risk; this could impact the protectiveness of the remedy. New ground water data have been collected. Modification to the ROD will be needed to address the ground water conditions that have been detected. Risk posed by ground water still exists.

VIII. Issues

Table 2 – Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Continuing erosion along the eastern perimeter of the site	N	N
Institutional controls not placed with regards to soils	N	N
Institutional controls not placed with regards to ground water	Y	Y
Ecological risk assessment not conducted for wetland area south of the MEW facility	Y	Y
Insufficient ground water monitoring to determine whether or not plume is migrating	N	Y
Insufficient ground water parameter data to determine whether natural attenuation is occurring	N	Y

IX. Recommendations and Follow-up Actions

Table 3 – Recommendations and Follow-Up Actions

Issue	Recommendations/Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Continuing erosion along the eastern perimeter of the site	Annual inspections; repair of slope if necessary	property owner	State/ EPA	June 30, 2005	N	N
Institutional controls not placed with regards to soils	No action	--	--	--	N	N
Institutional controls not placed with regards to ground water	Have institutional controls placed on property to prohibit ground water use	property owner(s)/City of Cape Girardeau	State/ EPA	September 30, 2005	Y	Y
Ecological risk assessment not conducted for wetland area south of MEW facility	Prepare an Ecological Risk Assessment after performing a focused RI in the wetland area	PRPs	State/ EPA	September 30, 2006	Y	Y
Insufficient ground water monitoring to determine whether or not plume is migrating	Monitor ground water, especially in wetland for an extended period to determine migration	PRPs	State/ EPA	September 30, 2007	N	Y
Insufficient ground water parameter data to determine whether natural attenuation is occurring	Monitor ground water for an extended period of time to evaluate potential for attenuation	PRPs	State/ EPA	September 30, 2007	N	Y

X. Protectiveness Statement

The soil remedy is protective of human health. The ground water portion of the remedy has not been implemented. The ground water could represent a risk to human health through ingestion or inhalation. New standards have been instituted for ecological protectiveness since the ROD was issued. Additional work should to be performed to determine whether or not there is an ecological risk.

Additional sampling and monitoring of the ground water will be performed to evaluate the migration of the contaminant plume below the wetland area and to evaluate the potential of natural attenuation of the contaminants of concern. An investigation will be performed to gather the data necessary for the Ecological Risk Assessment. A determination will be made after the Ecological Risk Assessment is complete whether or not additional actions will be required for protectiveness of the environment.

XI. Next Review

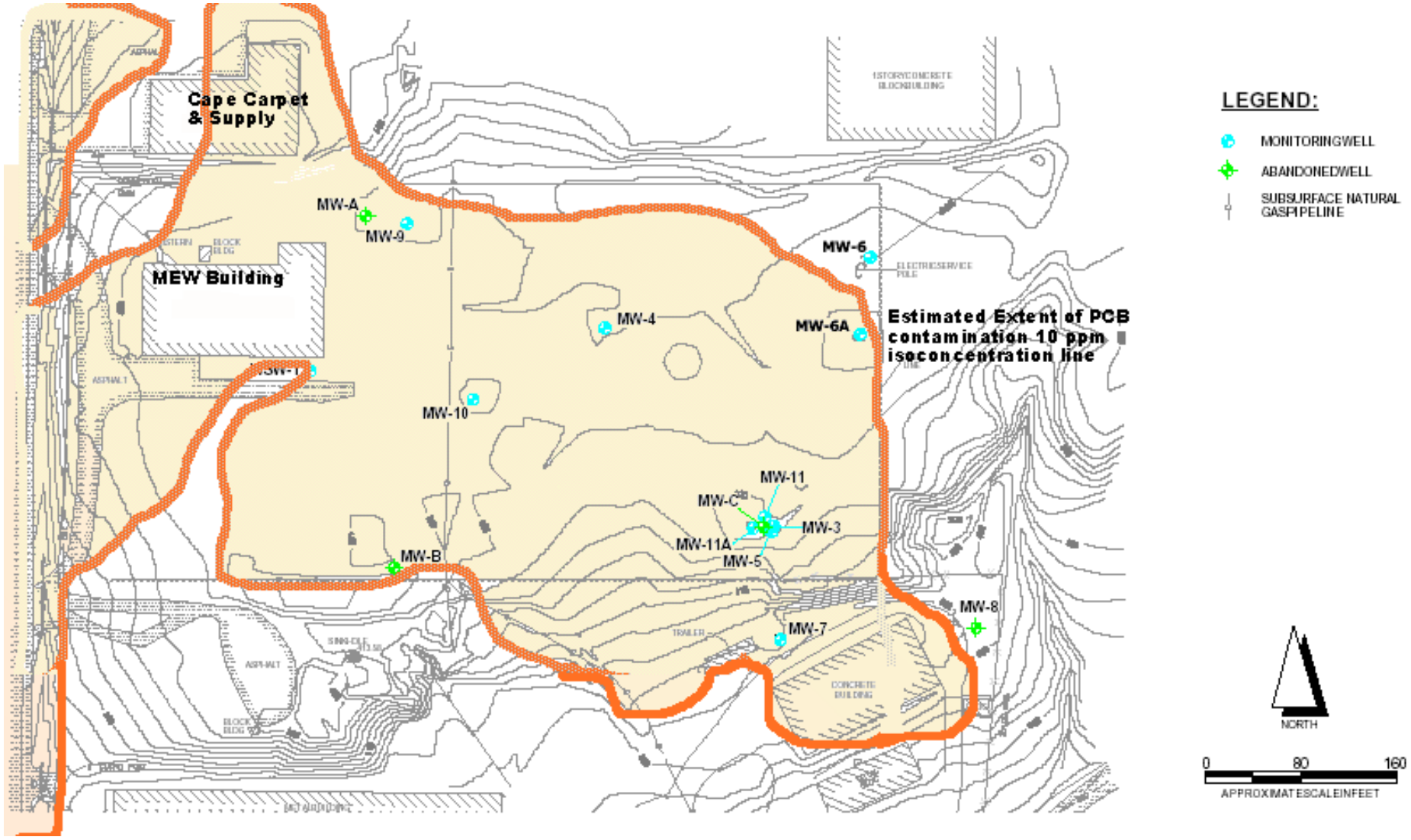
The next five-year review for the MEW Superfund site is required by September 2009, five years from the date of this review.

ATTACHMENT 1


CAPE GIRARDEAU
N
MEW
MISSISSIPPI
BLACK LAND
BOTTOM
INTERCHANGE 93
NOTES:
1) BASE MAP FROM USGS 7.5 MINUTE CAPE GIRARDEAU QUADRANGLE (1965, REVISED 1993).
2) ALL LOCATIONS ARE APPROXIMATE.
APPROXIMATE SCALE IN MILES
0
0.5
1

Missouri Electric Works (MEW) – Site Location Map

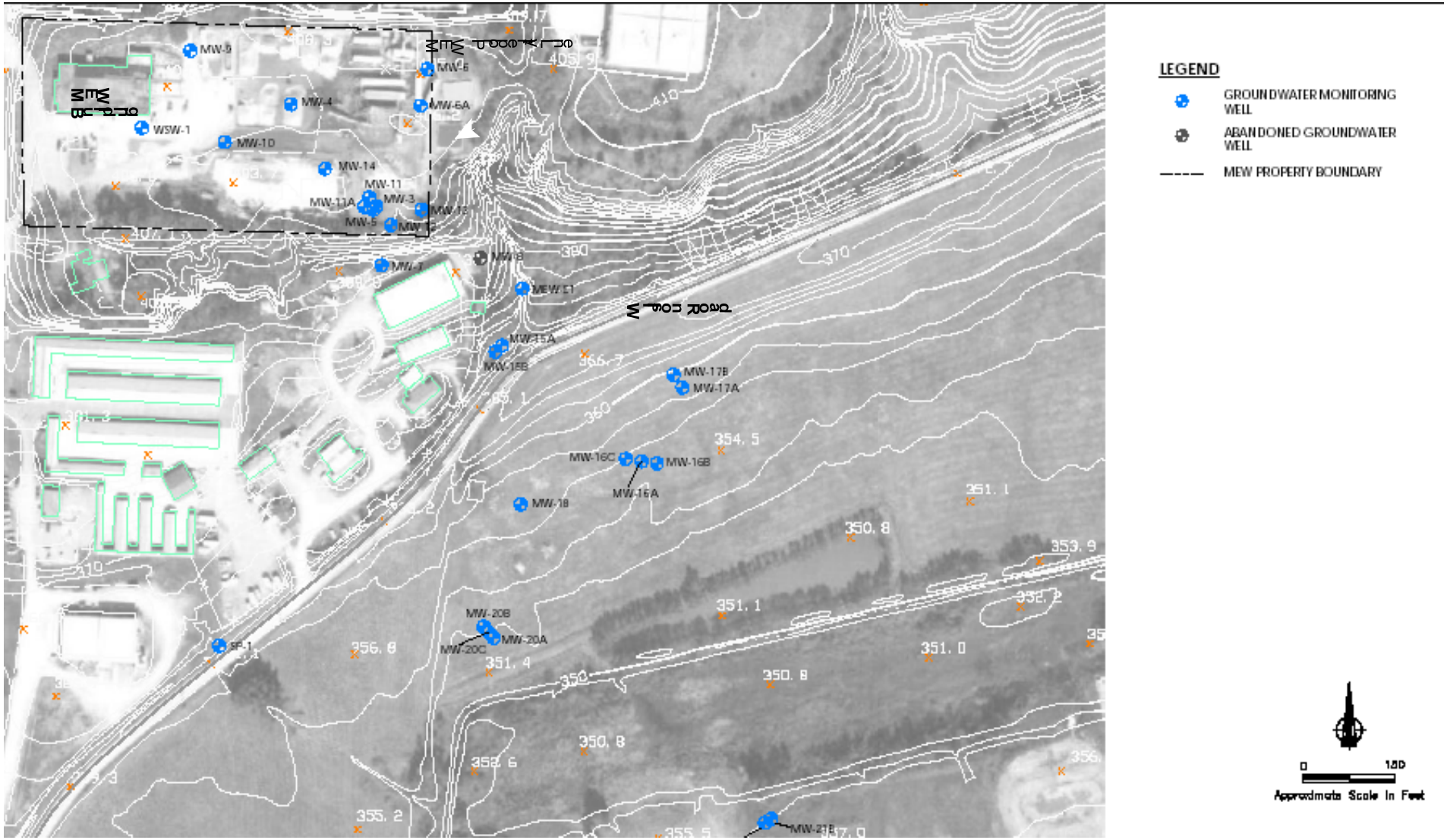
ATTACHMENT 2



MISSOURI ELECTRIC WORKS (MEW) – SITE PLAN

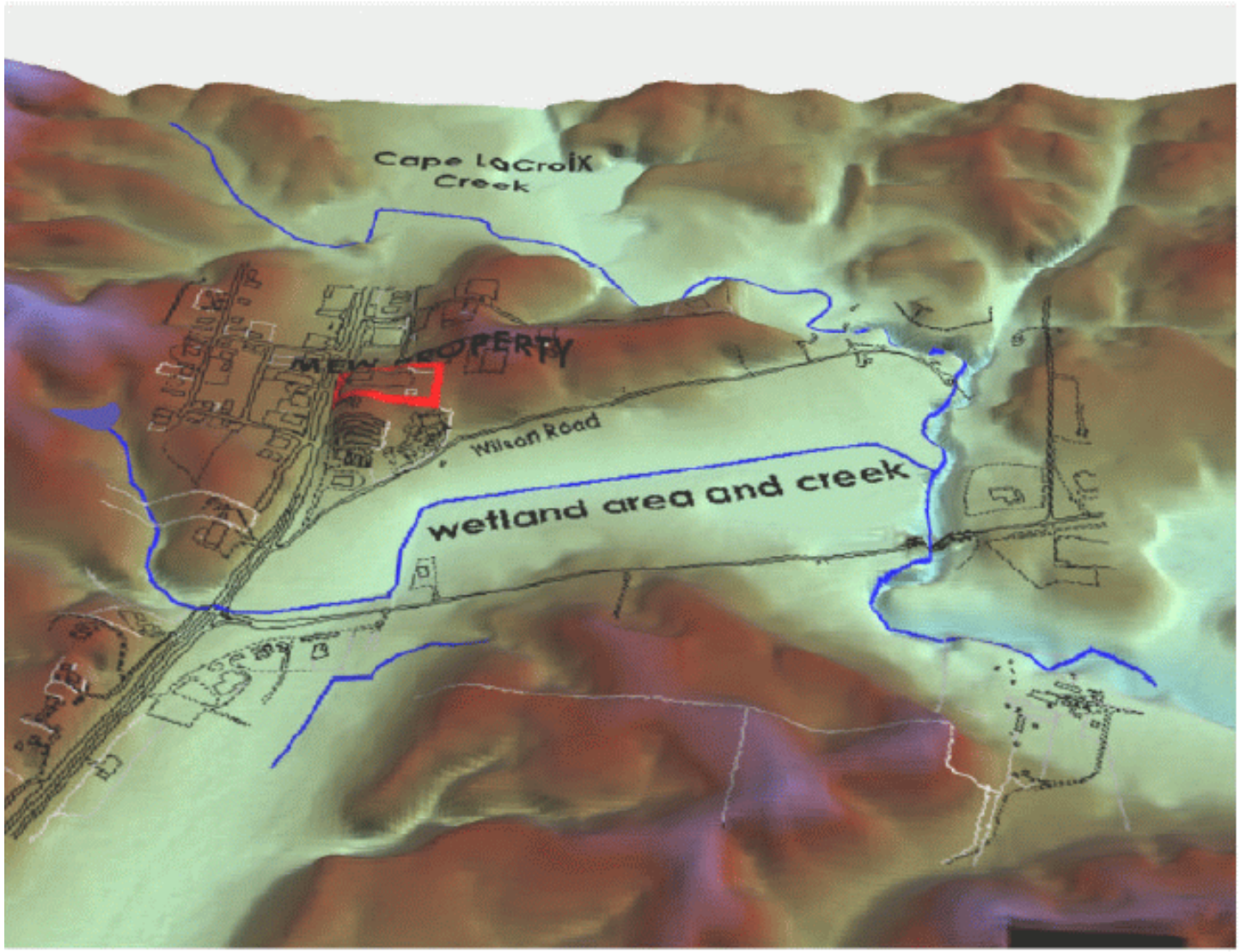
Indicating Estimated Extent of PCB concentration prior to the Soil Remedial Action

(from 1990 Remedial Investigation Report)



Missouri Electric Works (MEW) – Site Plan

ATTACHMENT 3



MEW
Property

Note:
View from south.
Vertical exaggeration
approximately 1.5 times

Missouri Electric Works (MEW) – Location of Wetland Area

ATTACHMENT 4

ATTACHMENT 4

List of Documents Reviewed

Missouri Electric Works Remedial Design for Thermal Desorption of Contaminated Soils, Williams Environmental, March 1999

Missouri Electric Works Soils Remedial Action Report, September 2000

Missouri Electric Works Quarterly Ground water Monitoring Reports, 2001, 2002, 2003, and 2004

Missouri Electric Works Ground water Remedial Investigation, July 2004

Missouri Electric Works Record of Decision, September 1990

Missouri Electric Works Explanation of Significant Differences, February 1995

Ecological Risk Assessment Guidance for Superfund, OSWER Directive 9285.7-28P, October 1999

Preliminary Remediation Goals for Ecological Endpoints, ES/ER/TM-162/R2, August 1997

Remedial Investigation Report, Missouri Electric Works site, Cape Girardeau, Missouri, The Earth Technology Corporation, July 1990

ATTACHMENT 5

ARARs Identified in the 1990 Record of Decision

FEDERAL CHEMICAL-SPECIFIC ARARs
MISSOURI ELECTRIC WORKS SITE

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	APPLICABLE RELEVANT AND APPROPRIATE	COMMENT
National Primary Drinking Water Standards	40 CFR Part 141	Establishes health-based standards for public water systems (maximum contaminant levels).	Yes	The MCLs for organic and inorganic contaminants are relevant and appropriate for ground water.
National Secondary Drinking Water Standards	40 CFR Part 143	Establishes welfare-based standards for public water (secondary maximum contaminant levels).	Yes	Secondary MCLs for these parameters/contaminants may be relevant and appropriate for ground water.
Maximum Contaminant Level Goals	40 CFR Part 141	Establishes drinking water quality goals set at levels of no known or anticipated adverse health effects with an adequate margin of safety.	Yes	Proposed MCLGs for organic contaminants should be treated as "other criteria, advisories and guidance."
Water Quality Criteria	40 CFR Part 131 Quality Criteria for Water, 1986	Sets criteria for water quality based on toxicity to aquatic organisms and human health.	Yes	AWQCs may be relevant and appropriate for surface water discharges.
Releases from Solid Waste Management Units	40 CFR Part 264 Subpart F	Establishes maximum contaminant concentrations that can be released from hazardous waste units in Part 264, Subpart F.	Yes	Onsite hazardous waste management unit may be considered. Same levels as MCLs.
National Ambient Air Quality Standards	40 CFR Part 50	Establishes primary (health based) and secondary (welfare based) standards for air quality.	Yes	Standards for particulate matter must be monitored during some remedial activities.
National Emission Standards for Hazardous Air Pollutants	40 CFR Part 61	Establishes emission levels for certain hazardous air pollutants.	Yes	Standards for some chemicals may relevant and appropriate to the site.

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	APPLICABLE RELEVANT AND APPROPRIATE	COMMENT
Occupational Health and Safety Regulations	**29 CFR 1910.1000 Subpart Z**	**Establishes permissible exposure limits for work-place exposure to many chemicals.**	**Yes**	**Listed chemicals detected on-site. Standards applicable to remedial worker exposure.**
Toxic Substances Control Act (TSCA)	**40 CFR Part 761**	**Establishes prohibitions of and requirements for the manufacture, processing, distribution in commerce, use disposal, storage and marking of PCB items. Sets forth PCB Spill Cleanup Policy.**	**Yes**	**The PCB Spill Cleanup Policy (Part 761.25) is a TBC which establishes cleanup guidelines for nonregulated access areas. Part 761.60 requirements for the storage and disposal of PCB-contaminated soil and provides a basis for utilizing alternative technologies for PCB treatment.** **Part 761.70 establishes requirements for PCB incin-erators, which are applicable if onsite or offsite incineration is involved.** **Part 761.75 establishes requirements for chemical waste landfills for land disposal of PCBs at concentrations of less than 500 ppm.**
Toxic Pollutant	**40 CFR Part 129**	**Establishes effluent standards or prohibitions for certain toxic pollutants: aldrin/dieldrin, DDT, endrin, toxaphene, benzidine, PCBs.**	**No**	**These pollutants were not detected in ground water samples.**

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	APPLICABLE RELEVANT AND APPROPRIATE	COMMENT
Identification and Listing (RCRA Waste)	**40 CFR Part 261**	**Defines those solid wastes of Hazardous Waste which are subject to regulation as hazardous under 40 CFR Parts 262-265 and Parts 124, 270, 271.**	**--**	**Applicability of RCRA regulations to wastes found at the site is pending resolution.**

STATE CHEMICAL-SPECIFIC ARARs
MISSOURI ELECTRIC WORKS SITE

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	APPLICABLE RELEVANT AND APPROPRIATE	COMMENT
Missouri Safe Drinking Water Act and Missouri Water Quality Standards	**10 CSR 20-7.031**	**Maximum chemical contaminant levels and monitoring requirements**	**Yes**	**The requirements may be relevant and appropriate for the MEW site.**
Missouri Hazardous Waste Management Regulations	**10 CSR 25-7.264**	**Standards for owner operators of hazardous waste treatment storage, and disposal facilities.**	**--**	**Applicability of regulation to wastes found at site is pending resolution**
Missouri Hazardous Waste Management Regulations	**10 CSR 25-10.010**	**Procedures for obtaining state approval for remedial actions at abandoned or uncontrolled sites.**	**Yes**	**The requirements may be applicable for the MEW site.**
Missouri Hazardous Waste Management Regulations	**10 CSR 25-11.010**	**Procedures and requirements for managing waste oil, which are in addition to Federal requirements on used oil.**	**Yes**	**These procedures may be applicable for the MEW site if removal of non PCB-contaminated oil is involved as a remedial action.**
Missouri Hazardous Waste Management Regulations	**10 CSR 25-13.010**	**Standards for management of waste materials or waste manufactured items containing PCBs at concentrations of fifty parts per million or more.**	**Yes**	**These standards may be applicable or relevant and appropriate requirements for the MEW site.**
Missouri Hazardous Waste Management Regulations	**10 CSR 25-6.263**	**Standards for Transporters of Hazardous Waste**	**Yes**	**These requirements may be applicable for the MEW site if removal offsite of hazardous waste non-PCB oils or PCB materials.**

FEDERAL LOCATION-SPECIFIC ARARS
MISSOURI ELECTRIC WORKS SITE

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	APPLICABLE RELEVANT AND APPROPRIATE	COMMENT
Protection of Wetlands	**Exec. Order No. 11,990** **40 CFR 6.302(a) and Appendix A**	**Requires Federal agencies to avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practical alternative exists.**	**Yes**	**The U.S. Army Corps of Engineers has identified a jurisdictional wetland near the MEW site.**

STATE LOCATION-SPECIFIC ARARs
MISSOURI ELECTRIC WORKS SITE

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	APPLICABLE RELEVANT AND APPROPRIATE	COMMENT
Protection of Lakes and Streams	**Missouri Water Quality Standards 10 CSR 20-7.031**	**Promulgates rules to protect quality of lakes and streams. Beneficial uses of Cape La Croix Creek listed as livestock and wildlife watering and warm water fishing.**	**Yes**	**Chemical specific ARARs are listed previously.**

FEDERAL ACTION-SPECIFIC ARARs
MISSOURI ELECTRIC WORKS SITE

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	APPLICABLE RELEVANT AND APPROPRIATE	COMMENT
CLEAN WATER ACT	**33 USC 1251-1376**			
National Pollutant Discharge Elimination System (NPDES)	**40 CFR Part 125**	**Requires permits for the discharge of pollutants for any point source into waters of the United States.**	**Yes**	**Permit not required for CERCLA activities; however, technical requirements for discharge must be met if onsite water treatment occurs and is discharged to surface water**
National Pretreatment Standards	**40 CFR Part 403**	**Set standards to control pollutants which pass through or interfere with treatment processes in public treatment works or which may contaminate sewage sludge.**	**Yes**	**Only if the treated ground water is discharged to a publicly owned treatment works (POTW).**
SOLID WASTE DISPOSAL ACT (SDWA)	**42 USC 6901 - 6987**			
Criteria for Classification of Solid Waste Disposal Facilities and Practices	**40 CFR Part 257**	**Establishes criteria for use in determining which solid waste disposal facilities and practices pose a reasonable probability of adverse effects on public health or the environment and thereby constitute prohibited open dumps.**	**Yes**	**The soil selected remedy will involve onsite disposal of incinerator ash.**
Standards Applicable to Generators of Hazardous Waste	**40 CFR Part 262**	**Establishes standards for generators of hazardous waste.**	**No**	**The selected remedies do not involve offsite transportation of either soil or ground water or treatment or disposal.**
Standards Applicable to Transporters of Hazardous Waste	**40 CFR Part 263**	**Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262**	**No**	**The selected remedies do not involve offsite transportation of hazardous wastes for treatment and/or disposal.**

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	APPLICABLE RELEVANT AND APPROPRIATE	COMMENT
Contingency Plan and Emergency Procedures	**Subpart D**	**Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262**	**Yes**	**If onsite ground water treatment system produces hazardous waste.**
Manifest System, Record	**Subpart E**	**Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262**	**Yes**	**If the selected remedies involve the offsite transport of hazardous waste.**
Use and Management of Containers	**Subpart I**	**Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262**	**Yes**	**If the selected remedies involve storage of containers.**
Tanks	**Subpart J**	**Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262**	**Yes**	**If the selected remedies involve the use of tanks to treat or store hazardous materials.**
Waste Piles	**Subpart L**	**Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262**	**Yes**	**If the selected remedies would treat or store hazardous materials in piles.**
Incinerators	**Subpart O**	**Establishes standards which apply to transporters of hazardous waste within the US if the transportation requires a manifest under 40 CFR Part 262**	**Yes**	**The selected remedy for soils is onsite incineration. Also covered by CFR 761.70.**
Land Disposal	**40 CFR Part 268**	**Establishes restriction for burial of wastes and other hazardous materials.**	**Yes**	**If the selected remedies would include offsite burial of contaminated soils or residues containing prohibited waste, a CERCLA waiver may be required.**

STANDARD, REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION	APPLICABLE RELEVANT AND APPROPRIATE	COMMENT
OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)	**29 USC 651 - 678 29 CFR Part 1910**	**Regulates work health and safety at hazardous waste sites.**	**Yes**	**Under 40 CFR 300.38, requirements of the Act apply to all response activities under the NCP.**
HAZARDOUS MATERIALS TRANSPORTATION ACT	**49 USC 1801 -1813**			
Hazardous Materials Transportation Regulations	**49 CFR Parts 171 - 178**	**Regulates transportation of hazardous materials.**	**Yes**	**If selected remedy would involve transportation of hazardous materials.**
TOXIC SUBSTANCES CONTROL ACT	**13 USC SEC. 2601 - 2629**			
PCB Requirements	**40 CFR Part 761**	**Establishes storage and disposal requirements for PCBs.**	**Yes**	**Treatment and disposal methodologies must meet substantive requirements set forth by 40 CFR 761.**
PCB Spill Cleanup Policy	**40 CFR Part 761**	**Establishes cleanup procedures for PCB spills.**	**Yes**	**Specifies soil cleanup levels and excavation requirements.**

ATTACHMENT 6

Quarterly Ground Water Monitoring Data

Table A-1 – Quarterly Comparison of Ground Water Concentrations

Contaminant: 1,1,1 TCA **MCL: 200 ppb**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
6A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
10	8.0	5.6	6.6	6.4	6.0	<5.0	5.3	4J	5.0	<5.0	<5.0	3J
11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
WSW	<5.0	<5.0	<5.0	<5.0	--	--	2J	<5.0	<5.0	<5.0	<5.0	<5.0
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. 1,1,1–TCA concentrations were less than 5.0 ppb.							<5.0	<5.0	<5.0	<5.0	<5.0
13								<5.0	<5.0	<5.0	<5.0	<5.0
14								<5.0	<5.0	<5.0	<5.0	<5.0
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. 1,1,1-TCA concentrations were <5.0 ppb.										<5.0	<5.0
15B											<5.0	<5.0
16A											<5.0	<5.0
16B											<5.0	<5.0
16C											<5.0	<5.0
17A											<5.0	<5.0
17B											<5.0	<5.0
18											<5.0	<5.0
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. 1,1,1-TCA concentrations were <5.0 ppb.											
20B												
20C												
21A												
21B												

Table A-2 – Quarterly Comparison of Ground Water Concentrations

Contaminant: TCE **MCL: 5 ppb**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4	<5.0	<5.0	<5.0	<5.0	5.0	3J	1.4	4J	3J	3J	5.2	5.1
5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
6A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
10	7.2	7.9	5.9	9.3	13	12	12	10	8.7	5.6	4J	4J
11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	3.2	2J	<5.0	2J	5.6	5.4
11A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
WSW	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	2J	--	--	5J	3J	4J
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. TCE concentrations were less than 5.0 ppb.							<5.0	<5.0	<5.0	<5.0	<5.0
13								<5.0	<5.0	<5.0	<5.0	<5.0
14								<5.0	<5.0	<5.0	<5.0	<5.0
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. TCE concentrations were <5.0 ppb with the exception of MW-16B and MW-16C which had concentrations of 9.2 ppb and 9.1 ppb respectively.										<5.0	<5.0
15B											<5.0	<5.0
16A											<5.0	<5.0
16B											9.5	7.4
16C											9.9	9.2
17A											<5.0	<5.0
17B											<5.0	<5.0
18											<5.0	<5.0
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. TCE concentrations were <5.0 ppb.											
20B												
20C												
21A												
21B												

Table A-3 – Quarterly Comparison of Ground Water Concentrations

Contaminant: PCE **MCL: 5 ppb**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4	<5.0	<5.0	<5.0	<5.0	3J	8.6	2.4	2J	<5.0	4J	5J	<5.0
5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
6A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1J		
10	<5.0	<5.0	<5.0	<5.0	3J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
WSW	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	--	<5.0	<5.0	<5.0
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. PCE concentrations were less than 5.0 ppb.							<5.0	<5.0	<5.0	<5.0	<5.0
13								<5.0	<5.0	<5.0	<5.0	<5.0
14								<5.0	<5.0	<5.0	<5.0	<5.0
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. PCE concentrations were <5.0 ppb.										<5.0	<5.0
15B											<5.0	<5.0
16A											<5.0	<5.0
16B											<5.0	<5.0
16C											<5.0	<5.0
17A											<5.0	<5.0
17B											<5.0	<5.0
18											<5.0	<5.0
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. PCE concentrations were <5.0 ppb.											
20B												
20C												
21A												
21B												

Table A-4 – Quarterly Comparison of Ground Water Concentrations

Contaminant: 1,1-DCA **MCL: –**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4	19	8.8	<5.0	13	15	24	17	7.5	18	9.8	15	22
5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
6A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	2J	<5.0		
10	16	<5.0	22	17	31	29	29	22	20	22	18	21
11	<5.0	<5.0	<5.0	<5.0	<5.0	4J	2.8	2J	<5.0	2J	3J	3J
11A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
WSW	<5.0	<5.0	<5.0	<5.0	<5.0		2J			8.7	5.7	5J
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. 1,1–DCA concentrations were less than 5.0 ppb.							<5.0	<5.0	<5.0	<5.0	<5.0
13								<5.0	<5.0	<5.0	<5.0	<5.0
14								3J	<5.0	3J	3J	4J
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. 1,1-DCA concentrations were <5.0 ppb with the exceptions of MW-16B and MW-16C which had concentrations of 2J ppb and 6.5 ppb, respectively.										<5.0	<5.0
15B											<5.0	<5.0
16A											<5.0	<5.0
16B											<5.0	2J
16C											5J	5J
17A											<5.0	<5.0
17B											<5.0	<5.0
18											<5.0	<5.0
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. 1,1-DCA concentrations were <5.0 ppb.											
20B												
20C												
21A												
21B												

Table A-5 – Quarterly Comparison of Ground Water Concentrations

Contaminant: 1,1-DCE **MCL: –**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4	7.7	<5.0	<5.0	6.4	9.9	6.1	2.2	7.0	<5.0	5.2	5.1	9.8
5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
6A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
10	7.0	<5.0	6.8	7.8	10	8.9	9.0	7.6	5J	4J	4J	4J
11	<5.0	<5.0	<5.0	<5.0	4J	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
WSW	<5.0	<5.0	<5.0	<5.0			2J			4J	4J	3J
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. 1,1–DCE concentrations were less than 5.0 ppb.							<5.0	<5.0	<5.0	2J	<5.0
13								<5.0	<5.0	<5.0	<5.0	<5.0
14								<5.0	<5.0	<5.0	<5.0	<5.0
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. 1,1-DCE concentrations were <5.0 ppb with the exception of MW-16B which had "J" coded data (1J).										<5.0	<5.0
15B											<5.0	<5.0
16A											<5.0	<5.0
16B											<5.0	1J
16C											<5.0	2J
17A											<5.0	<5.0
17B											<5.0	<5.0
18											<5.0	<5.0
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. 1,1-DCE concentrations were <5.0 ppb.											
20B												
20C												
21A												
21B												

Table A-6 – Quarterly Comparison of Ground Water Concentrations

Contaminant: 1,2-DCE **MCL: –**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4	<5.0	<5.0	<5.0	<5.0	4J	2J	<5.0	3J	<5.0	2J	2J	4J
5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
6A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11	<5.0	<5.0	<5.0	<5.0	2J	8.0	6.4	3J	<5.0	4J	9.8	7.7
11A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
WSW	<5.0	<5.0	<5.0	<5.0			<5.0			<5.0	<5.0	<5.0
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. 1,2–DCE concentrations were less than 5.0 ppb.							<5.0	<5.0	<5.0	<5.0	<5.0
13								<5.0	<5.0	<5.0	<5.0	<5.0
14								<5.0	<5.0	<5.0	<5.0	<5.0
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. 1,1-DCE concentrations were <5.0 ppb with the exceptions of MW-16B and MW-16C which had concentrations of 3J and 12 ppb respectively.										<5.0	<5.0
15B											<5.0	<5.0
16A											<5.0	<5.0
16B											3J	2J
16C											12	11
17A											<5.0	<5.0
17B											<5.0	<5.0
18											<5.0	<5.0
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. 1,1-DCE concentrations were <5.0 ppb.											
20B												
20C												
21A												
21B												

Table A-7 – Quarterly Comparison of Ground Water Concentrations

Contaminant: Benzene **MCL: 5 ppb**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	5.3	5.6	16	14	17	11	9.0	9.6	7.3	8.0	11	8.8
4	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
5	<5.0	<5.0	<5.0	<5.0	<5.0	3J	2J	<5.0	<5.0	<5.0	<5.0	<5.0
6A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
7	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
11A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
WSW	<5.0	<5.0	<5.0	<5.0			<5.0			<5.0	<5.0	<5.0
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. Benzene concentrations were less than 5.0 ppb with the exception of MW-12 which had a concentration of 26 ppb..							30	19	51	42	54
13								<5.0	<5.0	<5.0	<5.0	<5.0
14								<5.0	<5.0	<5.0	<5.0	<5.0
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. Benzene concentrations were <5.0 ppb.										<5.0	<5.0
15B											<5.0	<5.0
16A											<5.0	<5.0
16B											<5.0	<5.0
16C											<5.0	<5.0
17A											<5.0	<5.0
17B											<5.0	<5.0
18											<5.0	<5.0
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. Benzene concentrations were <5.0 ppb.											
20B												
20C												
21A												
21B												

Table A-8 – Quarterly Comparison of Ground Water Concentrations

Contaminant: Chlorobenzene **MCL: 20 ppb**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	510	320	1,400	1,600	1,200	590	630	800	630	420	250	690
4	30	6.3	15	21	42	<5.0	<5.0	17	14	5J	4J	39
5	19	<5.0	16	29	45	120	130	44	7.9	38	32	20
6A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
7	<5.0	<5.0	<5.0	5.6	9.8	<5.0	<5.0	<5.0	<5.0	2J	<5.0	<5.0
9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	1J	<5.0	<5.0	<5.0
11	6.2	8.2	7.7	<5.0	18	39	1.9	4J	<5.0	5J	3J	<5.0
11A	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
WSW	<5.0	<5.0	<5.0	<5.0			2J			<5.0	<5.0	3J
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. Chlorobenzene concentrations were less than 5.0 ppb in MW-13. Chlorobenzene concentrations in MW-12 and MW-14 were 3,000ppb and 7.4 ppb, respectively.							2,000	2,000	1,800	2,000	2,100
13								<5.0	<5.0	<5.0	<5.0	<5.0
14								2J	8.9	5J	5J	6.0
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. Chlorobenzene concentrations were <5.0 ppb.										<5.0	<5.0
15B											<5.0	<5.0
16A											<5.0	<5.0
16B											<5.0	<5.0
16C											<5.0	<5.0
17A											<5.0	<5.0
17B											<5.0	<5.0
18											<5.0	<5.0
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. Chlorobenzene concentrations were <5.0 ppb.											
20B												
20C												
21A												
21B												

Table A-9 – Quarterly Comparison of Ground Water Concentrations

Contaminant: 1,2,4-TCB **MCL: 70 ppb**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4	41	<10	18	16	30	30	<10	20	22	8J	6J	45
5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
6A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		
7	24	<10	<10	<10	16	28	8J	15	51	62	16	13
9	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		
10	31	31	28	18	10	13	12	9J	7J	4J	4J	3J
11	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
11A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
WSW	<10	<10	<10	<10			<10			<10	<10	<10
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. 1,2,4–TCB concentrations were less than 10 ppb with the exception of MW-12 which had a concentration of 30 ppb.							26	<10	16	16	11
13								<10	<10	<10	<10	<10
14								<10	<10	<10	2J	2J
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. 1,2,4-TCB concentrations were <10 ppb.										<10	<10
15B											<10	<10
16A											<10	<10
16B											<10	<10
16C											2J	<10
17A											<10	<10
17B											<10	<10
18											<10	<10
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. 1,2,4-TCB concentrations were <10 ppb.											
20B												
20C												
21A												
21B												

Table A-10 – Quarterly Comparison of Ground Water Concentrations

Contaminant: 1,2-DCB **MCL: –**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	<10	<10	<10	<10	<10	<10	2J	2J	<10	2J	2J	2J
4	<10	<10	<10	3J	<10	5U	4J	2J	<10	<10	5J	5J
5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
6A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		
7	<10	<10	<10	<10	<10	<10	<10	<10	<10	2J	<10	<10
9	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		
10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
11	<10	<10	<10	<10	<10	<10	5U	<10	<10	<10	<10	<10
11A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
WSW	<10	<10	<10	<10			<10			<10	<10	<10
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. 1,2–DCB concentrations were less than 10 ppb with the exception of MW-12 which had a concentration of 33ppb.							28	9J	19	17	15
13								<10	<10	<10	<10	<10
14								<10	<10	<10	2J	2J
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. 1,2-DCB concentrations were <10 ppb.										<10	<10
15B											<10	<10
16A											<10	<10
16B											<10	<10
16C											<10	<10
17A											<10	<10
17B											<10	<10
18											<10	<10
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. 1,2-DCB concentrations were <10 ppb.											
20B												
20C												
21A												
21B												

Table A-11 – Quarterly Comparison of Ground Water Concentrations

Contaminant: 1,3-DCB **MCL: –**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	<10	<10	<10	<10	6J	6J	8J	9J	<10	9J	9J	6J
4	13	<10	<10	<10	8J	<10	5U	9J	7J	10	7J	16
5	<10	<10	<10	<10	<10	<10	<10	1J	8J	<10	<10	<10
6A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		
7	<10	<10	<10	<10	<10	<10	<10	2J	4J	4J	2J	<10
9	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		
10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
11	<10	<10	<10	<10	<10	<10	5U	<10	<10	<10	<10	<10
11A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
WSW	<10	<10	<10	<10			<10			<10	<10	<10
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. 1,3–DCB concentrations were less than 10 ppb with the exception of MW-12 which had a concentration of 98 ppb.							100	37	71	67	51
13								<10	<10	<10	<10	<10
14								<10	<10	<10	2J	2J
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. 1,3-DCB concentrations were <10 ppb.										<10	<10
15B											<10	<10
16A											<10	<10
16B											<10	<10
16C											3J	3J
17A											<10	<10
17B											<10	<10
18											<10	<10
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. 1,3-DCB concentrations were <10 ppb.											
20B												
20C												
21A												
21B												

Table A-12 – Quarterly Comparison of Ground Water Concentrations

Contaminant: 1,4-DCB **MCL: 750 ppb**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	25	16	17	12	17	18	20	22	<10	21	24	16
4	<10	<10	<10	13	4J	5U	9J	7J	5J	3J	21	21
5	<10	<10	<10	<10	<10	5J	8J	7J	21	<10	5J	<10
6A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		
7	<10	<10	<10	<10	<10	<10	<10	3J	4J	8J	2J	2J
9	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		
10	<10	<10	<10	<10	<10	2J	<10	1J	<10	<10	<10	<10
11	<10	<10	<10	<10	<10	<10	5U	<10	<10	<10	<10	<10
11A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
WSW	<10	<10	<10	<10			<10			<10	<10	<10
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. 1,4–DCB concentrations were less than 10 ppb with the exception of MW-12 which had a concentration of 120 ppb.							100	43	77	72	51
13								<10	<10	<10	<10	<10
14								<10	2J	4J	4J	4J
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. 1,4-DCB concentrations were <10 ppb with the exception of MW-16C which had a concentration of 2J.										<10	<10
15B											<10	<10
16A											<10	<10
16B											<10	<10
16C											2J	<10
17A											<10	<10
17B											<10	<10
18											<10	<10
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. 1,4-DCB concentrations were <10 ppb.											
20B												
20C												
21A												
21B												

Table A-13 – Quarterly Comparison of Ground Water Concentrations

Contaminant: PCB (Aroclor 1260 unfiltered) **MCL: 0.5 ppb**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	4.7	1.1	<0.50	1.2	<0.50	0.7	2.1	<0.50	<0.50	<0.50	<0.50	<0.50
4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
5	85	11	5.4	13	12	110	36	14	5.0	11	28	<0.50
6A	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50		
7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.3J	<0.50
9	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50		
10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
11	14	3.5	0.9	1.2	2.6	0.69	0.59	<0.50	<0.50	1.0	0.4J	<0.50
11A	3.0	<0.50	1.8	1.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
WSW	<0.50	<0.50	<0.50	<0.50			<0.50			<0.50		<0.50
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. PCB (Aroclor 1260-unfiltered) concentrations were less than 0.50 ppb.							<0.50	<0.50	<0.50	8.3	<0.50
13								<0.50	<0.50	<0.50	<0.50	<0.50
14								<0.50	<0.50	<0.50	<0.50	<0.50
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. PCB (Aroclor 1260-unfiltered) concentrations were less than 0.50 ppb.										<0.50	<0.50
15B											<0.50	<0.50
16A											<0.50	<0.50
16B											<0.50	<0.50
16C											<0.50	<0.50
17A											<0.50	<0.50
17B											<0.50	<0.50
18											<0.50	<0.50
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. PCB (Aroclor 1260-unfiltered) concentrations were less than 0.50 ppb.											
20B												
20C												
21A												
21B												

Table A-14 – Quarterly Comparison of Ground Water Concentrations

Contaminant: PCB (Aroclor 1260 filtered) **MCL: –**

Well No.	Concentration in ppb											
	04/2001	07/2001	10/2001	01/2002	05/2002	08/2002	10/2002	02/2003	05/2003	08/2003	10/2003	02/2004
3	<0.20	<0.50	NA	<0.50	NA	0.20U	NA	NA	NA	NA	NA	NA
4	NA	NA	NA	NA	NA	NA	0.20U	NA	NA	NA	NA	NA
5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
6A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	NA
9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11	<0.50	<0.50	<0.50	<0.50	<0.50	NA	0.20U	NA	NA	<0.50	<0.50	NA
11A	<0.50	NA	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	NA
WSW	NA	NA	NA	NA			NA			NA	NA	NA
12	These wells were installed during late November -early December 2002. They were first sampled on December 11, 2002. Analysis for PCB (Aroclor 1260-filtered) were not performed at that time.							NA	NA	<0.50	<0.50	NA
13								NA	NA	NA	NA	NA
14								NA	NA	NA	NA	NA
15A	These wells were installed during late August to early September 2003. They were first sampled September 15 or 16, 2003. Analysis for PCB (Aroclor 1260-filtered) was not performed.										NA	NA
15B											NA	NA
16A											NA	NA
16B											NA	NA
16C											NA	NA
17A											NA	NA
17B											NA	NA
18											NA	NA
20A	These wells were installed during April 2004. They were first sampled April 19 or 20, 2004. Analysis for PCB (Aroclor 1260-filtered) was not performed.											
20B												
20C												
21A												
21B												